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ABSTRACT

A project was conducted to design a system for evaluating microcomputer courseware for vocational and technical education. Through a literature review and contacts with organizations and individuals involved in courseware evaluation and use, project staff identified and acquired for review documents pertaining to courseware evaulation, vocational or technical education courseware products, and evaluation forms. A matrix was developed to aid in producing a preliminary evaluation form. Two panels of consultants refined the evaluation form and assisted in development of a companion guide. Pilot-test participants and supplemental reviewers helped to refine the form and guide further. Following the 30-page narrative, the system for evaluating microcomputer courseware--the evaluation form and evaluation guide--is provided. The courseware evaluation form contains three parts: descriptive information about the courseware, evaluative criteria, and a summary rating. Written to assist users of the courseware evaluation form, the guide includes a brief description and explanation of the evaluation form, a suggested procedure for using the evaluation system, a glossary of terms, and a brief explanation of every item in the courseware evaluation form. Recommendations are made for continued efforts in courseware evaluation. Project materials--lists of panel members, correspondence, agendas--are appended. Listings of references and additional readings are provided. (YLB)

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A SYSTEM FOR EVALUATING MICROCOMPUTER COURSEWARE FOR VOCATIONAL AND TECHNICAL EDUCATION

Final Report

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U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
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February 1984

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FOREWORD

A System for Evaluating Courseware for Vocational and Technical Education describes the strategies used by the National Center for Research in Vocational Education to design a microcomputer courseware evaluation system that would meet the unique and specialized needs of vocational and technical education. It is anticipated that the resulting evaluation form and guide developed in this project will better enable courseware users to assess the quality of microcomputer courseware in the vocational and technical areas and select courseware of high quality.

The contributions of technical panel participants, pilot-test participants, and supplemental reviewers are gratefully acknowledged. These individuals provided valuable feedback regarding the content of the evaluation system. The names of these individuals are listed in appendixes to this report.

The National Center is indebted to Dr. Shirley A. Chase, who served as Project Director, and to project staff members Ruth Gordon, Program Associate, and Richard C. Makin, Graduate Research Associate. Other National Center staff who contributed to the development of the courseware evaluation system include Dr. Wesley E. Budke, Dr. Louise Vetter, Dr. Steve Franchak, and Dr. Robert Campbell, Research Specialists; Yvonne Bergland, Alan Kohan, and Oscar Potter, Graduate Research Associates; and Mike Vordenberg and Brent Miller, student assistants in computer programming.

Other individuals contributing suggestions for the evaluation form to this project included Dr. Roger D. Roediger, College of Agriculture, The Ohio State University; Robert First, South-Western Publishing Company; and Isaac Reed, Supervisor, Trade and Industrial Education, Columbus Public Schools. Acknowledgment is due to John Smart of High Technology for arranging the loan of two Franklin microcomputers and to the many individuals and agencies, especially the curriculum coordination centers, for sending and loaning microcomputer courseware and courseware evaluation forms.

Critical reviews of the final report were provided by Dr. Lois Hughes, Chairperson, American Home Economics Association Computer Software Evaluation Committee; Dr. Blannie Bowen, Associate Professor, College of Agriculture and Home Economics, Mississippi State University; and Gale Zahniser, Program Associate, and Dr. James P. Long, Research Specialist, of the National Center.

Recognition also is due Bettina Lankard and Michael Wonacott, Program Associates, who assisted with the preparation of the final report; to Stephen Klyce and Ruth Walston, typists, and Janet Ray, word processor operator; and to Janet Kiplinger, Administrative Associate, who provided the final editorial review.

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

The purpose of this project was to design a system for evaluating microcomputer courseware for vocational and technical education. Through an extensive literature review and contacts with organizations and individuals involved in courseware evaluation and use, project staff identified and acquired for review numerous documents pertaining to courseware evaluation, over 100 vocational or technical education courseware products, and over 40 evaluation forms. A matrix was developed to aid in developing a preliminary evaluation form to be used as the basis for review and further development by a panel of five consultants. These consultants and the five who served on a second panel provided valuable suggestions that were used in refining the preliminary evaluation form. The second panel of consultants also assisted with the development of a guide to accompany the form. Pilot-test participants and supplemental reviewers helped staff to further refine the form and guide. Information about the evaluation system was disseminated through various newsletters, publications, and conferences.

As tested and refined, the form is organized in three parts: descriptive information about the courseware, quality criteria for rating the courseware, and a summary evaluation. The guide itself explains an overall evaluation procedure and the details of using the form.

Project staff also developed recommendations for continued efforts in the evaluation of microcomputer courseware for vocational and technical education. The major recommendation emerging from the study is that a centralized agency or network provide national leadership in microcomputer courseware availability and evaluation for vocational and technical education.

CHAPTER I

INTRODUCTION

The project A System for Evaluating Microcomputer Courseware for Vocational and Technical Education was conducted from June 1, 1983, to February 29, 1984, by the National Center for Research in Vocational Education. This project was sponsored by the Office of Vocational and Adult Education, U.S. Department of Education. The purpose of the project was to develop a courseware evaluation system that would focus on the specific needs of vocational and technical education.

Background

One needs only to scan the headlines today to become aware that we live in a world of computers. Computer-assisted instruction (CAI) is of such interest to educators that conferences and workshops featuring information or materials on computers and courseware are often overflowing with participants. Statistics on the number of computers in schools are often out of date before they can be published. However, some of the latest data, collected by Market Data Retrieval from July to September 1983 and released in October 1983, indicate that more schools began using computers during the past year than in all prior years combined. Now over 86 percent of senior high schools have computers.

Vocational educators are investing valuable funds to purchase computers with the idea of becoming computer literate themselves and providing such training for students. Teachers eagerly seek courseware to use on their new computers, only to discover that the exploration of available courseware

should have been conducted before the hardware was purchased. Now they are finding that quality courseware to meet their instructional needs is not available or may be prohibitive in cost.

Although courseware development is progressing rapidly in both quantity and quality, products still are often of varying quality. There has been a proliferation of courseware developed by individuals and agencies without the necessary expertise. Therefore, the courseware available may or may not warrant its cost, so that considerable time and effort need to be expended in identifying, evaluating, and selecting courseware to meet specific vocational and technical education needs before scarce resources are invested.

Currently, evaluation of courseware is being conducted by many diverse organizations and individual reviewers. Courseware reviews are published in computer magazines and databases; however, few have been found for vocational and technical education. Thus, potential users do not even have a basis for selecting courseware for preview, much less for making final decisions on acquisition and use.

An evaluation system that focuses on microcomputer courseware for vocational and technical education is needed to take the guesswork out of the vocational educator's courseware selection. Such a system not only will help users of courseware but also can influence developers to address the specific needs of vocational and technical education in the products they develop. In addition, the system may be used by professional reviewers in evaluating courseware for published reviews.

Purpose and Objectives

The purpose of this project was the development of such an evaluation system. The specific objectives were as follows:

- To review the literature about the systems for evaluating microcomputer software for vocational education
- To adapt or design a system for evaluating microcomputer software for vocational education
- To pilot-test the system with at least ten pieces of instructional software
- To disseminate information about the evaluation system through established National Center dissemination mechanisms

CHAPTER II

PROCEDURES

Literature Review

The objectives of the literature review were to identify the following materials and people:

- o Existing evaluation systems for microcomputer courseware
- o Criteria for courseware evaluation
- o Vocational education courseware for pilot testing
- o Potential participants for the technical panels

To achieve these four objectives, project staff conducted computer searches of online databases, gathered information and materials from individuals and organizations identified in the searches, and reviewed and summarized the information obtained through all sources.

Searches were conducted of the following online databases:

- o Bilingual Education Bibliographic Abstracts (BEBA)
- o Data Processing and Information Science Contents (DISC)
- o Dissertation Abstracts International (DISS)
- o Educational Resources Information Center (ERIC)
- o International Software Database
- o Microcomputer Index
- o Online Microcomputer Software Guide and Directory (SOFT)
- o Ontario Education Resource Information Database (ONED)
- o Resources in Computer Education (RICE)

o School Practices Information File (SPIF)

o Vocational Education Program Improvement (RIVE)

The RIVE database was especially helpful in providing information about current projects related to microcomputer courseware in vocational and technical education.

Summary of Literature

Project staff used the resources of The Ohio State University libraries, the National Center's research library, and the organizational files of the Resource and Referral Service at the National Center to acquire printed copies of relevant journal articles, microfiche copies of ERIC documents, and general, relevant information. A substantial part of the evaluation literature consists of journal articles, conference papers and proceedings, and monographs that address issues pertinent to courseware evaluation. The content of much of this literature tends to be repetitive. The main recurring themes are the need for quality courseware, the need for an evaluation process, and the need for an opportunity to preview the courseware before making a selection.

One of the first things noted in the review of the literature was the inconsistent use of terminology in the field. For this study, microcomputer instructional programs are referred to as courseware, although the term software is also used in the field. Hence, both terms appear in this summary of the literature.

Five major areas for consideration in courseware evaluation are summarized in Microcomputer Software for Adult Vocational Education: Guidelines for Evaluation (Stone 1983):

o Learning objectives and task analysis

o Appropriate use of the technology

- o Pedagogical considerations
- o Management considerations
- o Documentation

All or some of the above considerations are discussed in detail in much of the evaluation literature examined by project staff. Most of the literature addressed issues pertaining to education in general. Microcomputers in Voc Ed: A Decision Guide (Zahniser, Long, and Nasman 1983) notes five concerns of importance to vocational and technical educators related to microcomputer courseware:

- o Issues regarding courseware research and development are more pressing for vocational education than for general education because vocational education is more specialized.
- o Technical courseware is needed for the hands-on, psychomotor activities typically a part of vocational education instruction.
- o New strategies for assessing computer-assisted instruction are needed to meet the training and retraining needs of adults.
- o Fewer commercial programs are available for vocational education courseware because the market is much smaller than the market for general education.
- o Vocational educators may need to develop courseware to ensure that the curriculum reflects the requirements of local employers.

A variety of other publications were acquired for review. Publications directed at national audiences include the National Council of Teachers of Mathematics' Guidelines for Evaluating Computerized Instructional Materials (Heck, Johnson, and Kansky 1981). Journals such as Infoworld, Educational Technology, and The Computing Teacher regularly publish narrative reviews of courseware. For those wishing to compare evaluations of a particular product, The Digest of Software Reviews: Education provides abstracts of published evaluations.

Evaluation of Educational Software: A Guide to Guides (Jones and Vaughan 1983) provides a compilation of ten different evaluation forms and a brief description of the organizations that developed them, along with three completed sample evaluations. The introductory chapter, "Evaluating the Evaluation Schemes," was written by Henry F. Olds, a noted specialist in the field, and includes critical comments on several of the major evaluation systems in current use and offers suggestions for the review process.

Other publications and information were available from organizations that have existing evaluation systems that are directed at national audiences. The materials from these organizations were also reviewed. These organizations and the materials they publish and distribute are as follows:

- CONDUIT distributes courseware that has passed CONDUIT's own review process and publishes courseware descriptions in Pipeline, its biannual journal.
- Educational Insights publishes Courseware Report Card, a journal of reviews that is available in two editions (elementary and secondary).
- Educational Products Information Exchange and Consumers Union (EPIE/CU) publish reviews of commercial courseware in Micro-Courseware PRO/FILES, which are available by subscription. Sample PRO/FILES also are included in Microgram, the EPIE newsletter.
- National Education Association (NEA) offers on subscription a catalog of NEA Teacher Certified software and publishes a series of three guides that detail the criteria used to evaluate software submissions.
- Northwest Regional Educational Laboratory (NWREL) includes software evaluations in the RICE database and publishes MicroSIFT reviews in The Computing Teacher and other journals. NWREL developed the MicroSIFT Evaluator's Guide (International Council for Computers in Education 1983).

Also reviewed were three projects described in the RIVE database. These projects address the courseware evaluation needs of vocational educators. They are as follows:

- o Identification and Evaluation of Computer Software in Home Economics--Conducted from January through June 1983 (Hovis and Bloom 1983) at Indiana University of Pennsylvania, the project developed an evaluation form for use in five areas of home economics.

- o Software Review: Learning Center at the Bureau of Vocational Education--Conducted from January through June 1983 by the Kentucky State Department of Education, this project was concerned with developing software evaluation procedures for implementation at the learning center.

- o Development of an Evaluative Instrument for Computer Programs with Application in Vocational Education--Oregon State University conducted this project from October 1982 through February 1983. An evaluation instrument was developed and tested with courseware related to vocational and technical education subject matter.

Computer searches of the RICE and RIVE databases were the most useful in identifying vocational and technical education courseware. In addition to descriptions of courseware, RICE provided a list of producers who could be contacted for catalogs and additional titles. RIVE provided information on courseware that was developed with Federal and state funds administered through the state departments of vocational education.

A compilation by Rodenstein and Lambert (1983) provides a listing of courseware programs for vocational education organized by vocational area. The programs are recommended as "quality products" and "worth examining." They have been "reviewed but not formally evaluated." The 1983 Educational Software Preview Guide (Educational Software Evaluation Consortium 1983) includes business education, industrial arts, and home economics programs. The programs listed in this guide are "recommended for preview."

Resources for small business applications are the focus of Microcomputers: Vocational Training for Small Business Management (Heath and Camp 1983). Included in this monograph are detailed descriptions of selected instructional packages for teaching concepts and skills in small business management, along with listings and descriptions of business applications packages.

The Minnesota Educational Computing Consortium (MECC) (n.d.) includes vocational education programs in its publication MECC Instructional Computing Catalog. Vocational education courseware also is included in the catalogs of the various commercial developers. (A selected listing of the courseware acquired and reviewed by project staff is included in appendix E of this report.)

Contacts

Information gathered in the computer searches enabled project staff to formulate a list of organizations and individuals to use as contacts. Contacts were made with organizations such as local secondary schools, intermediate school districts, curriculum resource centers, curriculum coordination centers, technical schools, colleges and universities, state departments of education, and other vocational and technical education agencies. Names of these organizations and of individuals were acquired through the computer searches, through the initial contacts, and through responses generated by requests for information and courseware products. Through these contacts, over 100 vocational and technical education courseware products were identified. Most of this courseware was compatible with the Apple IIe microcomputer. Therefore, that hardware was leased for project staff to use in reviewing the acquired products. In addition, over 40 courseware evaluation forms covering various areas and levels of education were identified and acquired. However, few of these evaluation forms related specifically to vocational and technical education and many of the forms did not evaluate the newer features of available courseware.

Information concerning how practitioners select courseware was also obtained. This information implied that while some practitioners have

established criteria they use in courseware selection, many simply make selections on the recommendation of others. All of the information gathered through contacts supported the belief that there is a real need in the field for a system to evaluate microcomputer courseware that is specific to the needs of vocational and technical education.

Agency Visits

Shirley A. Chase visited MECC on August 9, 1983. The purpose of the visit was to become familiar with the activities and services of MECC and to discuss National Center project efforts with the MECC staff. Karen Jostad, a MECC staff member, reviewed the courseware evaluation form, then in its early stages of development, and made comments and suggestions. A tour of the facility and visits with support staff were also a part of the visit.

Dr. Chase attended the second annual Microcomputers and High Technology in Vocational Education Conference sponsored by the Vocational Studies Center in Madison, Wisconsin, August 10-12, 1983. The wide array of conference presentations and exhibits and the number of contacts available during this conference provided an exceptional opportunity to learn the state of the art of microcomputers for instructional purposes in vocational and technical education.

Ruth Gordon visited the Oswego County Board of Cooperative Educational Services (BOCES) in Oswego, New York, on November 7, 1983. BOCES develops courseware for slow learners who have trouble reading regular materials. Students use the courseware individually or in small groups. Kathy Finnerty, BOCES staff member, reviewed the courseware evaluation form and offered suggestions for developing a useable evaluation form.

Ms. Gordon also visited EPIE/CU in New York City on November 9, 1983. Staff member Ellen Bialo described the EPIE/CU procedures for courseware evaluation, preparation of the Micro-Courseware PROFILES, and information dissemination. She also offered suggestions for the courseware evaluation system being developed.

Dr. Chase attended the MECC Educational Computing Conference on November 21-22, 1983, in Minneapolis, Minnesota. This conference provided an array of activities presenting the state of the art of microcomputers in all of education. The newest features of hardware and courseware were highlighted, giving the basis for adapting the National Center's courseware evaluation system.

Dr. Chase attended the pre-AVA Conference "The Use of Computers in Vocational Instruction" on December 1, 1983. The types of courseware available and how to evaluate it were the main topics of interest. Review of the materials made it evident that the National Center's System for Evaluating Microcomputer Courseware in Vocational and Technical Education is more comprehensive and specific to the field than any of those displayed or reviewed during the conference.

Richard C. Makin visited NEA Educational Computer Service in Bethesda, Maryland, on December 13, 1983. The purpose of the visit was to gain knowledge of the NEA software evaluation system and to obtain comments from NEA on the courseware evaluation system for vocational and technical education being developed at the National Center. On behalf of NEA, Carol Trawick explained that the primary concern of NEA is the communication of courseware evaluation standards that are applicable on a nationwide basis. NEA has published its first major catalog of microcomputer courseware products, but the catalog does not contain any listings for vocational and technical education. Interest and

support were expressed for the National Center's courseware evaluation system, especially for the sections that related specifically to vocational and technical education, an area that NEA has not yet addressed but is interested in exploring in the future.

NEA has developed three documents that make up a guide to the software assessment procedure to be used in software evaluation. These documents are available to educational users and the general public who want to know the criteria currently used to evaluate NEA Teacher Certified software (National Education Association 1983a, 1983b, and 1983c).

Shirley A. Chase visited NWREL February 15, 1984. The visit included meetings with Dr. Thomas Owens and other staff members. The RICE database and other services of NWREL were explained. Collaborative efforts between the National Center and NWREL in the areas of microcomputer courseware evaluation and online databases were explored.

This same trip also included a visit to the Vocational Education Division of the State Department of Education, Salem, Oregon. Wanda Monthey hosted Dr. Chase's visit on February 16-17 to the state department, which provides funding and support to many courseware development projects in the state; to Lane Community College, at Eugene; and to Oregon State University at Corvallis. Activities in microcomputer courseware development and evaluation were discussed and observed at these institutions.

During each of the visits, visibility was given to the National Center's courseware evaluation system. Suggestions for its dissemination and use were secured.

Related Activities

The literature review also resulted in the identification of persons actively involved in the use of microcomputers for classroom instruction. This information was useful in compiling a list of potential members for the two technical panels. During the course of the project, a fifth objective was added for the literature review: to provide vocational and technical educators with comprehensive resources about courseware and evaluation and availability of vocational and technical education courseware. This objective was added because of the numerous requests for such information received by project staff. Therefore, the literature review, which was originally planned for only the first 2 months of the project, was continued by staff through updates of online searches of the ERIC, RIVE, and RICE databases and continued review of materials until the preparation of the final report.

Evaluation System Adaptation and Design

Initial Development of the Evaluation Form

Evaluation forms were collected through a review of the literature, through personal contacts, and through a request for such forms in the project profile, electronic newsletters, and the National Center's Centergram. All forms were then studied to determine if an existing form could be used, either intact or revised, to meet the needs of vocational and technical education. Since no form was discovered of sufficient scope to cover all aspects of vocational and technical education, project staff undertook to develop an original form through a combination of approaches.

First, a matrix was developed using the indices of evaluation criteria and evaluation forms. By using this matrix, staff quickly determined which

evaluation criteria were present in given evaluation forms. If a particular criterion was present in a large percentage of the forms, that criterion was included in the initial draft of the preliminary evaluation form. In some cases, project staff judged as important evaluative criteria that were present in only a small percentage of the evaluation forms; these too were included in the initial draft of the preliminary evaluation form. After compiling a list of evaluation criteria, project staff grouped criteria of a similar nature into sections. The sections were based on those present in the collected evaluation forms.

The criteria were next reviewed by individuals with a background in microcomputers in education. Their input was particularly important in regard to the technical aspects of courseware evaluation. Additions or deletions were made to the evaluation criteria on the basis of the recommendations of these individuals. Project staff also contributed criteria identified through actual review of vocational and technical education courseware.

The evaluative criteria identified through these three sources were then revised as needed for conciseness and clarity. Selected National Center staff members then reviewed the evaluation form prior to the convening of Panel I. Recommendations were incorporated as appropriate. In addition to these evaluative criteria, descriptive items were concurrently developed. These items organized a body of information about the courseware: identification, system requirements, instructional setting, and a general description of the program. They were grouped in a separate part of the microcomputer courseware evaluation form, Part A. As presented for review to Panel I participants, the evaluative criteria (now Part B of the form) were grouped in the following sections:

Section	Number of Criteria
o subject matter content	7
o instructional design	
--subject matter presentation	9
--technical presentation	15
--teacher use	4
--student use	8
--feedback	9
--evaluation	7
--personal/social development	7
--vocational development	6

Also compiled for review by Panel I were 22 response formats. From these, one was to be selected and used in conjunction with the evaluative criteria in Part B. The basic variations included the following:

- o yes, no, open-ended description
- o yes, no, not applicable
- o low to high rating
- o excellent, very good, good, poor, very poor
- o 1-5 Likert scale
- o weighting and Likert scale in combination

Numerous versions of the above response formats were found on existing forms and in the literature, accounting for the total number of 22 response formats collected.

Panel I Review

Panel I was composed of five persons both from general and from vocational and technical education. All panel members had experience in developing

evaluation instruments or expertise in the microcomputer field. Prior to the meeting, each panelist was sent a packet of materials including a project profile and a tentative agenda (see appendix A). The panel met for 2 days, on August 24 and 25, 1983. The purpose of the panel was to assist project staff in the further development of the preliminary courseware evaluation system.

On August 24, the panel worked primarily on Part B of the evaluation form. Each participant was asked to rate each criterion in Part B on a scale of 0-3 (3 = essential, 2 = important, 1 = of minor importance, 0 = not needed). This activity and the ensuing staff-directed discussion led to the addition, deletion, or revision of many of the criteria. Major changes included the recommendation that a summary (Part C) be added and that an application programs section be added to Part B.

Revisions included the following:

- o Integrate subject matter content and subject matter presentation sections
- o Expand the technical presentation section
- o Change the title of the teacher use section to "Teacher Manual"
- o Delete items in the evaluation section

Prior to adjournment for the day, a response format was selected from among 22 alternative formats. The format selected requires the user to check YES, SOMEWHAT, NO, or N/A for each criterion. Panel members suggested the incorporation of a COMMENTS column into the response format. Panel members strongly recommended that open-ended questions also be incorporated into the response format.

On August 25, project staff directed panel efforts toward two major objectives. The first objective was to study and revise Part A of the evaluation

form. Since much of the information therein is factual, many changes dealt with semantics. Revisions included the following:

- o Separate the availability items in the identification section and include them in a separate availability section
- o Delete the general description of the program

In general, Part A of the courseware evaluation form was accepted as proposed in the preliminary form.

The second objective of the day was the actual use of the courseware evaluation form by the panel members. The intent of this "hands-on" experience was to raise questions and issues regarding the ease of use, clarity, and usefulness of the courseware evaluation form. Each member of the panel reviewed courseware and applied the evaluation form to that product. Courseware was reviewed in the areas of industrial arts, health services, home economics, and trade and industrial education.

Following the reviews, panel members and project staff collectively discussed concerns and problems related to the courseware evaluation form. Revisions were made as needed. Prior to adjournment of the panel, project staff requested suggestions for the guide that would accompany and be used with the evaluation form. It was decided that specific terms should be identified and defined in a glossary. Mention was made that the guide should include recommendations on how to use the evaluation form and contain a disclaimer regarding the ultimate purpose of the evaluation system.

Panel I members were asked for suggestions on how to improve the review process for use with Panel II. The following suggestions were given:

- o Provide an opportunity for participants to review the courseware evaluation form prior to the panel meeting
- o Provide an opportunity for participants to review the evaluation form listing and bibliography prior to the panel meeting

- Provide a detailed explanation of panel objectives and purposes prior to the panel meeting

After recommendations from Panel I were incorporated, the evaluation form consisted of the following:

- Part A:

  --identification
  --system requirements
  --instructional setting
  --availability

- Part B:

Section	Number of Criteria
--subject matter	12
--technical presentation	16
--teacher's manual	2
--student use	8
--feedback	9
--evaluation	5
--personal/social development	7
--vocational development	6

Panel II Review

Panel II was convened September 21-22, 1983, at the National Center. This panel was composed of five vocational and technical educators who had experience in development or evaluation of microcomputer courseware. These persons were also potential users of the completed courseware evaluation system, so they had a special interest in its development.

After Panel II participants were selected, they were sent a packet of materials (see appendix B), including a letter of confirmation, a tentative agenda for their meeting, and a project profile. Later, a second letter was mailed to keep participants informed and to alert them to pick up a packet of informational materials, including the evaluation form, on arrival at their

motel the evening prior to the meeting. This gave participants an opportunity to scan the materials they would be working with the following day.

The meeting was opened with an orientation session. Then Panel II participants were asked to use the evaluation form to review courseware. Two Franklin computers on loan and the Apple IIe leased for the project were provided so that no more than two participants worked at a computer at one time. After the courseware review, a session was held to solicit general comments and suggestions on the evaluation form.

Considerable time was spent reviewing Part B of the form, revised as a result of Panel I recommendations. The relevance of each criterion was discussed by the group using the following considerations:

- o Importance to courseware evaluation
- o Applicability to vocational and technical education
- o Language/terminology used
- o Coverage of important issues

Part B of the form was further refined by eliminating some criteria, revising others, and making some additions. After this refinement process, two new sections of the evaluation form were developed: documentation and application. Panel II gave support to retaining the section on vocational development, viewing those criteria as critical to vocational and technical education curricula.

The second day was opened with a session to review more courseware, this time using the refined version of the evaluation form completed the previous day. Subsequently, Panel II members made their final revisions to the courseware evaluation form.

Each Panel II member was asked to prepare written recommendations on the courseware evaluation form and its use. A summary of the recommendations follows:

- o Add an overall recommendation item and a listing of sections as a one-page summary to the evaluation form
- o Provide vocational and technical education state department personnel, teacher educators, and curriculum centers the more detailed, comprehensive courseware evaluation form and develop a short version of the courseware evaluation form for use by classroom teachers
- o Improve the evaluation form layout
- o Change the application section title to "Application Programs Only"
- o Strengthen the "Application Programs Only" section and move it to the end following the vocational development section
- o Strengthen the vocational development section
- o Add a COMMENTS column on the right side of the page so comments can be made for each criterion included in Part B of the evaluation form
- o Conduct field testing
- o Disseminate the courseware evaluation system through curriculum centers
- o Provide information on the courseware evaluation system through existing National Center publications
- o Direct promotion to the following target audiences: classroom teachers, local administrators, state department personnel, teacher educators, and curriculum developers and reviewers
- o Distribute the evaluation system in conjunction with a national clearinghouse to prevent the duplication of courseware evaluations in vocational and technical education
- o Conduct courseware evaluations and disseminate the reviews through the National Network for Curriculum Coordination for Vocational and Technical Education (NNCCVTE) and the Vocational Education Curriculum Materials (VECM) database
- o Conduct workshops on the courseware evaluation system at vocational education conferences
- o Train individuals (e.g., state liaison representatives) to develop dissemination procedures that would be appropriate to their states or

regions so that they could in turn train others in the use of the courseware evaluation system

- o Obtain assistance from state directors to provide miniworkshops throughout states to inservice teachers on the courseware evaluation system
- o Request that colleges and universities use the form with graduate classes in vocational and technical education
- o Enlist teacher educators to provide preservice vocational and technical education teachers with training on the use of the courseware evaluation system

Panel II members were divided into two groups to work in developing portions of the guide to accompany the courseware evaluation form. They worked on the item description portion of the guide that is correlated to Part B of the courseware evaluation form. These developmental efforts were used later by project staff in the final development of the guide.

Following the incorporation of Panel II recommendations, National Center staff members reviewed the courseware evaluation form. The changes suggested and incorporated were as follows:

- o Change the title of the vocational development section in Part B to "Work Behaviors"
- o Use a more consistent format in Part A
- o Include specific directions for each section in Part A
- o Include preview policy in the availability section of Part A
- o Include a section summary in Part C
- o Change the title of the evaluation summary in Part C to "Final Recommendation"

Pilot Test

Trial use of the evaluation system was conducted with the assistance of three groups of people. These were National Center staff members, vocational practitioners, and curriculum and resource people. Following the

incorporation of recommendations from Panel II, the evaluation system was first used on a trial basis with National Center personnel. This occurred on November 1 and 2, 1983. The purpose of this trial was to establish procedures for reviewing vocational and technical education courseware and to obtain feedback regarding the clarity and feasibility of the evaluation system. On the basis of information found in the literature, several alternative sequences of activites for courseware evaluation were devised and applied. Following the internal trials with the evaluation system, project staff and participants then discussed the effectiveness of these alternatives. This resulted in the adoption of a review process to be used during the second phase of the trial with vocational and technical teacher reviewers.

The courseware evaluation system was next used with local vocational practitioners in agriculture, business and office education, health services, home economics, industrial arts, and trade and industrial education. The background of the teachers in both using the microcomputer and evaluating courseware was quite diverse. This proved beneficial in that different concerns and suggestions, which were based on the individuals' different levels of experience, were expressed. The purpose of the trials was again to obtain feedback regarding the ease of use of the system and clarity of both the evaluation form and guide and to secure suggestions for improving the evaluation system. Staff members sought practitioners' suggestions for revision of the review process resulting from the internal trial with National Center staff. For the most part, the practitioners were receptive to the review strategy employed. This trial-use portion of the project was conducted individually with teacher reviewers between November 8 and November 30, 1983, at the National Center.

The process during the trial use was as follows: participants were first given a brief orientation regarding the scope and purpose of the project. Emphasis was placed on the purpose of the trial--i.e., evaluation of the evaluation system. If necessary, participants also were given an introduction to and demonstration of the Apple IIe computer. Following the orientation, participants were encouraged to review the evaluation system and any documentation accompanying the courseware. The teachers then reviewed their program twice, as both good and poor students. The evaluation form was then completed, with teachers allowed to refer back to parts of the program when necessary. The last phase of the process consisted of both a written and a oral evaluation of the evaluation system.

The discussions between project staff and participants at the close of the process were of particular value. Trial use of the evaluation system on an individual basis averaged 2 to 3 hours. As a whole, participants in the trials were receptive to the evaluation system and shared a consensus that the system would be of value to vocational and technical educators. Comments and suggestions were incorporated into the courseware evaluation system when appropriate. Major recommendations from the practitioners included the following:

- o Revise the format
- o Expand the application section
- o Retain the work behaviors section
- o Retain the detailed, comprehensive evaluation form
- o Clarify and expand Part A of the evaluation form (courseware feature items in particular)

The third group of individuals to make trial use of the evaluation system was curriculum and resource people attending the Sixth Nationwide Vocational

Education Dissemination Conference at the National Center. This aspect of the trial use was conducted on November 16, 1983. Participants registered for the evaluation session as part of the conference. There was again great diversity in the participants' vocational background and previous experience with courseware evaluation and use of microcomputers.

The review process that was used with the vocational and technical practitioners was again used with the resource and curriculum specialists. Recommendations made by these individuals are summarized:

- o Revise the technical presentation section
- o Retain the work behaviors section
- o Clarify the procedure to follow in evaluating courseware

During and following the pilot test, two representatives of commercial courseware development firms visited with project staff to demonstrate courseware: Robert First, South-Western Publishing Company; and Chris Sakelaris, Borg Warner Educational Systems Division. These demonstrations provided project staff with greater insight into the state of the art in commercial courseware development.

Dissemination of Project Information

Information about the project was disseminated through a one-page project profile and through news releases that included requests for help in locating evaluation forms and vocational and technical education courseware. These releases appeared in the following publications:

- o National Postsecondary Alliance Bits and Pieces, July 1983
- o Career Planning and Adult Development Newsletter, vol. 5, no. 10, October 1983
- o Career Education News, vol. XII, no. 19, November 1, 1983

- o NASSP News Leader, vol. 31, no. 4, December 1983, published by the National Association of Secondary School Principals
- o American Teacher, vol. 68, no. 4, December 1983/January 1984

The same type of release was included in two electronic newsletters, High Tech for Postsecondary Educators and Vocational Education Newsletter (VOCN), and released through the electronic mail system. It also appeared in the June 29, 1983, issue of RDx Monthly Memo, compiled by the Far West Laboratory for Educational Research and Development for distribution to members of the Research and Development Exchange.

These news releases resulted in many responses that provided contacts, courseware products, and evaluation forms for project staff to review. Requests for information and materials on the project also were received.

An informational article was published in the October 1983 issue of the National Center's Centergram. This article also led to many requests from the field for information and materials on the availability and evaluation of vocational and technical education courseware. The large number of requests and other responses generated by the articles confirmed the current need for a courseware evaluation system related to vocational and technical education.

Information about the project was also disseminated at conferences and workshops. Shirley A. Chase attended a workshop on microcomputers sponsored by the Ohio Department of Education for vocational directors and supervisors on August 2, 1983. The session attended was for home economics supervisors. The presenter was Nancy Dillon, from Strictly Software, Inc., who spoke on using microcomputers for instruction. Dr. Chase informed the group about the National Center study on microcomputer courseware evaluation.

Ruth Gordon presented "Hands-on Experience in Reviewing Home Economics Software" at a joint meeting of the Franklin County Home Economics Association

and District D of the Ohio Home Economics Association on September 29, 1983. This activity provided visibility for the National Center's courseware evaluation system.

Dr. Chase also gave presentations on computer courseware evaluation to the following groups at the American Vocational Association (AVA) Convention December 4-6, 1983:

- o Home Economics Teacher Educators
- o Vocational Instructional Materials (VIM)
- o American Vocational Education Research Association (AVERA) session (prepared paper)

Visibility was given the project at the Sixth Nationwide Vocational Education Dissemination Conference on November 16-17, 1983. The two workshop sessions were titled as follows:

- o "Evaluating Voc Ed Courseware"
- o "Getting Acquainted with Voc Ed Courseware"

Agency visits by project staff as mentioned previously in this report promoted and gave visibility to the study.

Description of Microcomputer Courseware Evaluation Form and Guide

The final courseware evaluation system for vocational and technical education consists of two components. These are the courseware evaluation form and the courseware evaluation guide.

The courseware evaluation form contains three parts, labeled A, B, and C. Part A organizes descriptive information regarding the courseware that is being evaluated. The five subcomponents of Part A are identification, hardware requirements, program features, instructional setting, and availability. The user completes as much of the requested information as possible following

a preliminary review of the courseware. Completion of Part A can serve as an initial screening device for courseware use. By comparing the descriptive information supplied in Part A with instructional needs, many users will be able to determine whether the courseware meets basic requirements--hardware, for example--before going on to the lengthier, more detailed evaluation in Part B. Other users, such as professional reviewers, will find Part A a convenient means of organizing this basic information for further reference.

Part B of the courseware evaluation form consists of sections of evaluative criteria. Seventy-four criteria are grouped into eight sections. The sections and their corresponding number of criteria are as follows:

Section	Number of Criteria
o Subject matter	10
o Technical presentation	8
o Student interaction	10
o Program interaction	9
o Student evaluation	8
o Documentation	9
o Work behaviors	8
o Application programs	12

The user is instructed to check the appropriate response for each criterion (YES, SOMEWHAT, NO, N/A) and to write explanatory comments when needed. It is important to note that not all sections would be applicable to all courseware.

Part C of the courseware evaluation form provides for a summary rating of the courseware being evaluated. Users are asked to identify strengths and weaknesses of the program as well as potential uses in an instructional setting. Sections of evaluation criteria are rated as a whole in the same manner as the previously discussed individual criteria. The last subcomponent of Part C is a final recommendation, with explanation, of the courseware being reviewed.

The courseware evaluation guide was written to assist users of the courseware evaluation form. Included in the guide are a brief description and explanation of the courseware evaluation form, a suggested procedure for using the courseware evaluation system, a glossary of terms, and a brief explanation of every item contained in the actual courseware evaluation form.

The description and explanation of the evaluation form briefly describe each part of the courseware evaluation form and then go on to explain how each part should be completed. A procedure is suggested for applying the courseware evaluation system to vocational and technical education courseware. The procedure should be appropriate for most of the target audiences, with professional reviewers being encouraged to modify the procedure to satisfy any special needs. The suggested evaluation procedure is also presented schematically in a flowchart. The glossary is brief by design and contains only 12 terms that had taken on a specialized meaning or were widely used in the courseware evaluation system. The largest portion of the courseware evaluation guide is the item explanations. Each item in the three parts of the courseware evaluation form, including the evaluation criteria, is explained for users' reference.

Although an attempt was made to develop the courseware evaluation form in a straightforward, understandable style, beginning courseware evaluators in particular should find the courseware evaluation guide beneficial in clarifying any items or criteria not understood. Experienced courseware evaluators may need only refer to the courseware evaluation guide for clarification of a few of the evaluation criteria. The courseware evaluation system in its entirety is presented in chapter 3.

CHAPTER III

A SYSTEM FOR EVALUATING MICROCOMPUTER COURSEWARE FOR VOCATIONAL AND TECHNICAL EDUCATION

CONTENTS

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MICROCOMPUTER COURSEWARE EVALUATION FORM

NOTE: If you are using this form for the first time, read the instructions in the accompanying Microcomputer Courseware Evaluation Guide.

Evaluator _____

Position _____

Date _____

Part A: Description

In the following sections, record descriptive information about the courseware that you are evaluating.

I. IDENTIFICATION

Program Title _____

Series Title _____

Vocational Area(s) _____

Subject Area(s) _____

Topic(s) _____

Developing Agency _____

Street or P.O. Box _____

City _____ State ____ Zip _____ Phone _____

Author(s) _____

Programmer(s) _____

II. HARDWARE REQUIREMENTS

Microcomputer* _____ (brand/model)

K Memory Required _____ (number)

Medium of Transfer (include number of each):

____Tape cassette ____5¼" Flexible disk ____Other _____
____ROM cartridge ____8" Flexible disk _____ (specify)

Programming Language _____ DOS Specifications _____

Other Specifications _____

Peripherals Needed (check all that apply):

____Color monitor	____Modem	____Clock
____One disk drive	____Mouse	____Video disk
____Two disk drives	____Printer	____Touch screen
____Plotter	____Graphics tablet	____Ten-key number pad
____Game paddle(s)	____Light pen	____Other _____
____Joystick(s)	____Voice/sound instrument	_____ (specify)

* NOTE: Provide the above information for any additional hardware on which this program can be used. _____

_____

_____

III. PROGRAM FEATURES (check all that apply):

_____Network version provided
_____Multiple copies required
_____Program can be modified
_____Program protected
_____Data disk needed
_____Field-test data available

IV. INSTRUCTIONAL SETTING

Program mode (check all that apply):

_____Application
_____Drill and practice
_____Educational gaming
_____Simulation
_____Tutorial
_____Other_____ (specify)

Student Target Population (check all that apply):

_____Regular
_____Disadvantaged
_____Handicapped
_____Limited English
_____Bilingual
_____Gifted

Grade Level (check all that apply):

_____K-6
_____7-8
_____9-10
_____11-12
_____13-14
_____Adult
_____Higher Ed

Instructional Grouping (check all that apply):

_____Individual
_____Small group (up to 4)
_____Large group (4 or more)
_____competitive interaction
_____cooperative interaction

Prerequisite Student Skills (specify)_____

Accompanying Materials (specify types):

Documentation_____
Student support materials_____
Teacher support materials_____

Correlated materials_____

Estimated Time for Use_____

V. AVAILABILITY

_____Free_____ (copies)
_____Sale $_____

_____Loan_____ (time)
_____Rent $_____ _____ (time)

_____Duplication (requestor supplies disk)

Copyright Restrictions (explain)_____

Back-up Policy (explain)_____

Preview Policy (explain)_____

Update Policy (explain)_____

Contact_____

Street or P.O. Box_____

City_____State_____Zip_____Phone_____

Part B: Evaluation Criteria

Indicate the applicability of each section to the courseware being evaluated by checking either "___A" (applicable) or "___N/A" (not applicable). If a section is not applicable, proceed to the next section. If a section is applicable, check the column that indicates how well the courseware meets each criterion. Include any comments.

	YES	SOME-WHAT	NO	N/A	COMMENTS
I. SUBJECT MATTER __A __N/A					
1. Subject matter has educational value.					
2. Student objectives are stated.					
3. Subject matter is accurate.					
4. Subject matter is logically presented.					
5. Subject matter is free of race, ethnic, sex, and other stereotypes.					
6. Subject matter is on the level of the students.					
7. Information and skills presented are comparable to those used in the home, business, or industry.					
8. Subject matter motivates students to learn.					
9. Subject matter is reviewed and summarized.					
10. Program utilizes the unique capabilities of the microcomputer to present the subject matter.					
II. TECHNICAL PRESENTATION __A __N/A					
1. Program is free of technical problems.					
2. The presentation rate is adequate to maintain interest.					
3. Information on the screen is easy to read.					
4. Program is free of spelling and grammatical errors.					
5. Program instructions are easy to follow.					
6. Color increases the instructional value of the program.					
7. Audio increases the instructional value of the program.					
8. Graphics increase the instructional value of the program.					

	YES	SOME-WHAT	NO	N/A	COMMENTS
III. STUDENT INTERACTION __A __N/A					
1. Students can use the program with minimal assistance.					
2. Students are actively involved in the program.					
3. Students control the pace of the program.					
4. Students can access the program "menu(s)" to change activities.					
5. Students are permitted to change answers.					
6. Methods of responding correspond to the level of the program.					
7. Students' errors of entry are processed so that the program continues to run.					
8. Students can access available "help" and "hint" options at any time.					
9. Students can enter or exit the program as desired.					
10. Students control the sequence of the program.					
IV. PROGRAM INTERACTION __A __N/A					
1. Feedback is immediate.					
2. Cues and prompts are provided to assist students in answering correctly.					
3. Feedback reinforces the correct responses.					
4. Feedback is nonthreatening.					
5. Program helps students understand wrong answers.					
6. Program gives the correct answer after a reasonable number of tries.					
7. Positive reinforcement is varied.					
8. Program has the ability to branch/loop depending upon students' performance.					
9. Feedback is on the level of the student.					
V. STUDENT EVALUATION __A __N/A					
1. Evaluation provides a means for measuring attainment of objectives.					
2. Program reports which items were missed and which were correct.					

	YES	SOME-WHAT	NO	N/A	COMMENTS
V. STUDENT EVALUATION--Continued					
3. Individual student performance results are available to the teacher.					
4. Class performance results are available to the teacher.					
5. Program provides for printed copies of evaluations.					
6. Test item formats are suited to the material being tested.					
7. Test items are clearly stated.					
8. Test item bank is provided.					
VI. DOCUMENTATION __A __N/A					
1. Documentation is easy to understand.					
2. Documentation is accurate.					
3. Student objectives are stated.					
4. Underlying concepts are outlined.					
5. Skills to be developed are specified.					
6. Procedures for integrating the program into the curriculum are provided.					
7. Follow-up activities are suggested.					
8. Documentation explains the intended use of support materials.					
9. Sufficient information is provided to operate the program.					
VII. WORK BEHAVIORS __A __N/A					
1. Program helps students identify their vocational skills.					
2. Program promotes pride in work.					
3. Program promotes productivity.					
4. Program encourages good work habits.					
5. Problem solving is encouraged.					
6. Program promotes good human relations skills.					
7. Program provides an opportunity for work satisfaction and self-fulfillment.					
8. Program encourages creativity.					

	YES	SOME-WHAT	NO	N/A	COMMENTS
VIII. APPLICATION PROGRAMS __A __N/A (to be completed for application programs only)					
1. Program is adaptable to the needs of the student.					
2. Commands are easily remembered.					
3. Information is easily manipulated.					
4. Corrections are easy to make.					
5. Program includes all necessary variables.					
6. Program performs reliably.					
7. Program efficiently achieves its intended purpose.					
8. Trial data are supplied for learning to run the program.					
9. Program provides for use of printer when hard copy of information is advantageous.					
10. Program moves from operation to operation efficiently.					
11. Program is compatible with other application programs.					
12. Program has a supplementary tutorial program available.					

Part C: Summary

1. SUMMARY COMMENTS

Identify strengths of the courseware:

Identify weaknesses of the courseware:

Describe uses of the program in an instructional setting:

2. SUMMARY OF SECTION EVALUATIONS

Rate the quality of the courseware for each applicable section of this form by checking the appropriate column; if not applicable, check N/A.

	YES	SOME-WHAT	NO	N/A
I. SUBJECT MATTER: Content has educational value.				
II. TECHNICAL PRESENTATION: Program is free of malfunctions.				
III. STUDENT INTERACTION: Students are actively involved with the program.				
IV. PROGRAM INTERACTION: Feedback is effectively employed.				
V. STUDENT EVALUATION: Evaluation adequately measures student progress.				
VI. DOCUMENTATION: Documentation is sufficient to run the program.				
VII. WORK BEHAVIORS: Program assists students in developing positive work attitudes and skills.				
VIII. APPLICATION PROGRAMS: Program performs the task for which it is intended.				

3. FINAL RECOMMENDATION

Check your recommendation for the courseware and explain your reasons below.

_____Highly recommend
_____Recommend
_____Recommend with reservations
_____Do not recommend

_____

_____

MICROCOMPUTER COURSEWARE EVALUATION GUIDE

NOTE: BEFORE USING THE COURSEWARE EVALUATION SYSTEM FOR THE FIRST TIME, THE USER SHOULD READ THIS GUIDE IN ITS ENTIRETY.

The courseware evaluation system is intended for vocational and technical educators, courseware developers, and persons conducting courseware reviews. It consists of an evaluation form and this guide. This guide is designed to provide assistance in using the form and clarification of each item on the evaluation form. The evaluation form consists of three parts as described below.

Evaluation Form Explanation

Part A

Part A contains descriptive information about the courseware product and should be filled out as accurately and completely as possible. The needed information may be located in the hard-copy documentation or within the program itself. Part A can serve as an initial screening device to determine whether the courseware review should be continued; for example, if the courseware is not compatible with your hardware or instructional setting, it probably would not be worthwhile to continue the evaluation process.

Part B

Related evaluation criteria are organized into eight sections. Each section represents a cluster of criteria needed for courseware evaluation and selection. It is important to note, however, that another element must be added to these criteria in order to arrive at a suitable evaluation of the

courseware: your own judgment. Although each criterion is an important indicator of quality, the overall evaluation of the courseware depends on your analysis of these criteria in relation to your own needs; therefore, it is important to keep several points in mind when completing this part of the evaluation form:

- o The criteria in the courseware evaluation form are numerous but not exhaustive and represent current knowledge and perceptions regarding courseware evaluation. As technology advances, interpretations of what constitues high-quality courseware may change.
- o An attempt has been made to present the criteria objectively. However, some criteria reflect a certain degree of subjectivity and personal values (e.g., "Program promotes productivity").
- o No relative importance is assigned to individual criteria. The value attached to individual criteria is situation-dependent; each user must weigh criteria in light of his or her own situation.
- o The suggested evaluation procedure does not explicitly provide for observation of student use of the courseware. This could be included in an evaluation, however, at the judgment of the user.

In completing Part B, the user should first decide which whole sections are applicable to the specific courseware being reviewed and then mark each section either __ A for applicable or __ N/A for not applicable. Then a response should be given for every criterion in each section marked A:

- o YES indicates that the criterion is fulfilled.
- o SOMEWHAT indicates that the criterion is only partially fulfilled.
- o NO indicates that the criterion is not fulfilled within the program but should be.
- o N/A indicates that the criterion is not fulfilled and does not need to be.

The COMMENTS column should be completed, at least for every item checked SOMEWHAT, to explain further why that rating was given. When "Application" is checked for Program Mode under Instructional Setting in Part A of the courseware evaluation form, Section VIII should be completed along with any other

applicable sections. This is a separate section because of the importance of application programs in vocational and technical education and because they require a different set of criteria for evaluation.

Part C

The purpose of Part C is to provide a means of summarizing your ratings of the courseware being reviewed. Although a complete review using the entire evaluation form is recommended, in certain circumstances Part C could be combined with Part A and used as a short evaluation or initial screening device.

Suggested Courseware Evaluation Procedure

The following is a suggested procedure for evaluating vocational and technical education courseware. It is intended for beginning courseware evaluators. Experienced courseware evaluators and professional reviewers can follow the procedure as is or adapt it in accordance with their background and need. The steps in the procedure are as follows:

1. Review the evaluation guide and form.
2. Review the documentation found in the hard copy and in the program. This will necessitate a cursory run-through of the program.
3. Complete Part A of the courseware evaluation form. The user may not be able to complete all information requested in Part A. Complete as many of the items as possible.
4. Determine the feasibility of continuing the courseware evaluation. If there is compatibility between the items completed in Part A and user needs, the evaluation process should proceed. If there is incompatibility the evaluation process may be discontinued.
5. Run the program as a good student, making correct responses.
6. Rerun the program as a poor student, making incorrect responses.
7. Complete Part B of the courseware evaluation form depending on the program mode checked. If an application program is included in the courseware, complete Section VIII and any other applicable sections of

Part B. If the program mode is other than application, complete all applicable sections of Part B, excluding Section VIII.

8. Summarize your ratings in Part B by completing Part C of the courseware evaluation form.

9. Decide if the courseware meets the needs of the students.

Figure 1 presents this suggested courseware evaluation procedure schematically.

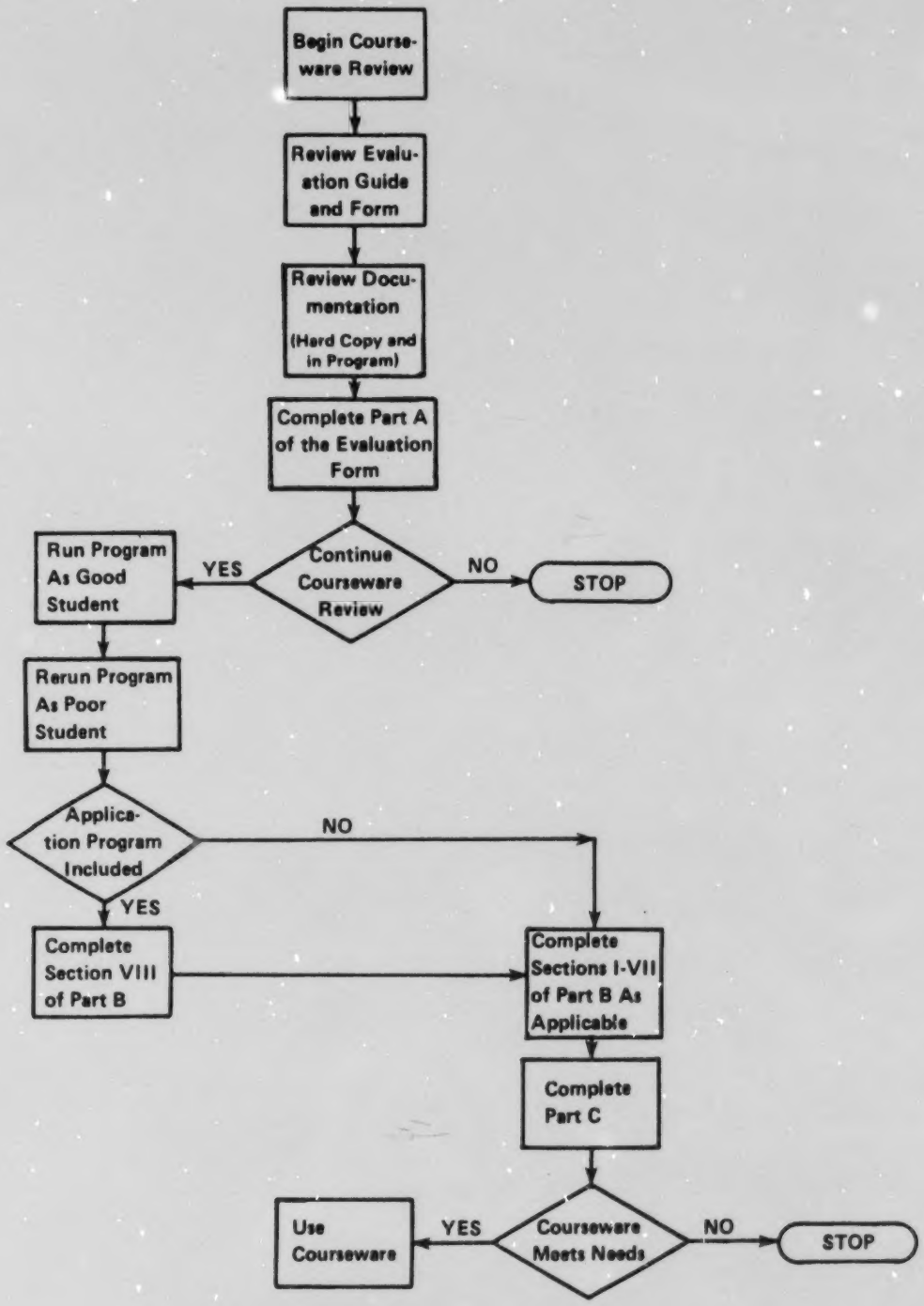

Figure 1. Suggested courseware evaluation procedure

Glossary

Branching	Program is designed so that students' progress is determined by the specific answers given.
Courseware	Combination of disk (or other medium of transfer) and the accompanying documentation and materials for instruction.
Disk	Thin, usually flexible, plate on which data or programs are stored.
Documentation	The description and instructions for use of a program. Documentation may be in hard copy or within the program itself.
Feedback	Response of program to user input of information.
Hardware	Either a single item or collection of mechanical or electronic items required for use of a microcomputer program. Examples of hardware include monitors and printers.
Memory	The section of the computer where instructions and data are stored.
Menu	List of choices within a program from which the user makes selections.
Program	Microcomputer unit of instruction that can stand alone.
Program Mode	The method or strategy used in the presentation of the subject matter.
Series	A group of separate programs related to one another in that each program bears, in addition to its own title, a collective title applying to the group as a whole.
Support Materials	Items that support the activities of the persons using the program (e.g., student workbook).

Evaluation Form Item Descriptions

Part A

An explanation of each item in Part A of the evaluation form is provided on the following pages.

I. IDENTIFICATION

Program Title	Name of the specific microcomputer instructional program (e.g., Introduction to Patterns).
Series Title	Name of the microcomputer instructional program series of which the specific program is a part (e.g., Know Your Pattern is a series of programs).
Vocational Area(s)	One or more vocational or technical areas for which the program could be used: agriculture, business and office education, health, home economics, industrial arts, marketing and distributive education, and trade and industrial education.
Subject Area(s)	A more specific content level under the vocational area (e.g., textiles and clothing).
Topic(s)	Specific topic(s) covered in the subject area specified (e.g., pattern alterations).
Developing Agency	The organization, agency or individual producing the courseware, address and phone.
Author(s)	Writer(s) of the content of the program.
Programmer(s)	Person(s) writing the content in programming language.

II. HARDWARE REQUIREMENTS

Microcomputer	Type of microcomputer needed to run the program (e.g., Apple IIe).
K Memory Required	Amount of memory needed to run the program (e.g., 48 K).

Medium of Transfer	Means used for storing the program (e.g., flexible disk).
Programming Language	Language used to program the content (e.g., BASIC).
DOS Specifications	Disk operating system required (e.g., 3.3).
Other Specifications	Any additional requirements in relation to hardware.
Peripherals Needed	Any add-on hardware units required to run the program (e.g., two joysticks).

III. PROGRAM FEATURES

Network Version Provided	Program runs on a centrally located microcomputer and is relayed to numerous student terminals.
Multiple Copies Required	Disk must remain in disk drive during operation of the program; requiring multiple copies if the program is used by students simultaneously.
Program Can Be Modified	Teacher can exercise the "list" command (access the lines making up the program) to make additions, deletions, or alterations.
Program Protected	Program cannot be listed (e.g., lines making up the program cannot be accessed).
Data Disk Needed	Data on file disk are required for the retrieval of information needed to run the program (e.g., employees and salaries to generate a payroll).
Field-Test Data Available	The results of field testing are available to prospective users of the program.

IV. INSTRUCTIONAL SETTING

Program Mode	Strategy or method used to present the content.
	Application: Provides a service by performing a job (e.g., spreadsheet).
	Drill and Practice: Provides repetition of information or skill previously acquired.

	Educational Gaming: Presents facts in new interesting ways and provides for logical guessing. Simulation: Presents real or imaginary events, compressing extended time to develop problem-solving skills in a safe environment. Tutorial: Introduces new concept(s) and provides for mastery learning by giving immediate reinforcement.
Student Target Population	Type(s) of student for which the program was developed.
Grade Level(s)	Educational level(s) for which the program is intended.
Instructional Grouping	Instructional grouping(s) of students with which the program can be used. If designed for group use, will the program stimulate cooperative or competitive interaction?
Prerequisite Student Skills	Competencies students must have before using the program.
Documentation	Instructions for using the program. Specify whether these are given in the program or in printed form.
Student Support Materials	Accompanying materials for student use (e.g., handouts, workbooks).
Teacher Support Materials	Accompanying materials for teacher use (e.g., program guide, tests).
Correlated Materials	The program and other instructional materials (e.g., textbook) are complementary.
Estimated Time for Use	Approximate time required to use the entire program.
V. AVAILABILITY	
Free, Loan, Duplication, Sale, Rent	Means by which the program may be obtained.

Copyright Restrictions	The program is copyrighted (i.e., reproduction or distribution of the program is forbidden without approval).
Back-up Policy	Vendor makes a second copy of the program available free or at a reduced cost.
Preview Policy	Courseware may be previewed before purchase under certain conditions.
Update Policy	Vendor provides revised versions of the program.
Contact	Name, address and phone of organization, agency, or individual from which the courseware may be obtained.

Part B

An explanation of each criterion in Part B of the evaluation form is provided on the following pages.

I. SUBJECT MATTER

1. Subject matter is a timely practical component of the curriculum and reflects information or skills that can be used by students in their occupational fields.

2. Learning outcomes are clearly identified for students. Objectives are presented at the beginning or placed throughout the program to reflect the progressive order of the desired learning.

3. Information is correct (e.g., graphs, text, statistics).

4. Subject matter is organized to reflect the usual sequence of events (e.g., simple to complex, chronological order).

5. Racial, ethnic, or sex groups are neither overrepresented nor underrepresented. There are no inaccurate or biased generalizations about the characteristics of these groups.

6. Vocabulary, readability level, difficulty of the material, and interest level are suited to the students.

7. The subject matter reflects the actual knowledge and skills currently used in the occupational area.

8. Subject matter is written and presented in a manner to engage and maintain students' interest in learning the concepts or skills.

9. Important ideas and concepts are reinforced (e.g., by emphasis, repetition, questioning). These same ideas and concepts are synthesized in summary.

10. Microcomputer capabilities (e.g., immediate feedback, untiring repetition) appear to provide one of the best ways of presenting the subject matter.

II. TECHNICAL PRESENTATION

1. Program runs consistently throughout without glitches (e.g., program does not stall).

2. The program displays text, makes calculations, draws graphics, and gives feedback fast enough to maintain students' interest.

3. Information is displayed in a format that is well designed and uncluttered. Text is not obscured by overlay of graphics.

4. Words are spelled correctly; grammar and punctuation are accurate throughout the program.

5. Instructions are consistent and unambiguous; complete, understandable directions are given for running the program.

6. When color is used, it does not detract from the intended purpose of the program (e.g., color makes material more realistic and interesting).

7. Audio is clear in tone and understandable. The audio does not distract students from the educational impact of the program. The program has an option to delete the audio when desired.

8. Graphics, either still or animated, do not detract from the subject matter presented. They illustrate and add meaning to the material.

III. STUDENT INTERACTION

1. Students can use the program without excessive assistance from the teacher.

2. Program promotes active rather than passive involvement of students by encouraging thinking and problem solving.

3. Students have control over the amount of time spent on each activity, thus individualizing the instruction to their specific needs.

4. A list of choices from which students can select is provided. Easy access to this list is available so students can make other selections when desired.

5. The program offers a way of going back to make changes when a wrong answer or response is given.

6. The complexity of the type of response is based on the capability level of the students (e.g., excessive keyboarding is not required if it has not been taught).

7. The program is "crash-proof." It does not stop or forfeit information when students either give wrong responses accidentally or try deliberately to make it fail.

8. When a student requests "Help," the program gives further instructions, reviews previous instructions, or provides assistance in progressing through the program.

9. The program provides students with the opportunity to exit when necessary (e.g., class period ends before program is completed) and to reenter at point ended, rather than start at beginning of the program again.

10. Students can change the order in which they go through the program. This permits them to go back to review or pick up information not covered.

IV. PROGRAM INTERACTION

1. Program interacts as soon as student response is made (e.g., informs student of accuracy of answers, presents further information, or explains previous information).

2. If the wrong answer is given, the program provides further information or clues (e.g., number of letters in the correct word is provided).

3. Correct responses are recognized in a positive manner (e.g., student is complimented on correct answer). The program's response to incorrect answers is not so interesting that incorrect responses are encouraged.

4. Students are not addressed in a derogatory manner (e.g., "You dummy") when incorrect answer is given.

5. Program does more than merely review the material; it provides the reason that the answer is incorrect (e.g., "Answer B is wrong because . . .").

6. The student is not permitted to continue making incorrect answers indefinitely. It is not possible to arrive at the correct answer by the process of elimination.

7. The type of positive reinforcement changes as the program progresses, since feedback such as "You're terrific" becomes tiresome when overused.

8. Program offers activities based upon the student's responses. Branching offers alternative activities, with different levels of difficulty or interest. Looping is a repeat of the activity for review.

9. The type and content of the feedback are geared to student comprehension.

V. STUDENT EVALUATION

1. Evaluation included in the program (whether test items or performance type) is based on the stated student objectives and indicates progress toward attainment of the objectives.

2. The results of each student's performance on the evaluation are provided by the program (e.g., test score, items correct, items wrong). This information is protected by a separate password for use by the individual student and the teacher.

3. Program identifies for individual students the items for which correct and incorrect responses were made. This assists students and teachers in understanding what corrective measures need to be taken. This information is protected by a separate password for use by the individual student and the teacher.

4. A composite view of class performance is given (e.g., average, range, percentiles) on the evaluation. This information is protected by a separate password for use by the teacher.

5. Hard copy of both individual student and composite class results is available to the teacher to facilitate record keeping. Hard copy of individual test results is available to the student.

6. The type of test item used (e.g., true-false, multiple choice, performance) is varied to reflect the best method of determining student attainment of objectives.

7. Test items are easy to understand. Content and vocabulary are consistent with those in the subject matter presented.

8. A data bank of test items provides the teacher with the capability of generating tests by a random sampling of items.

VI. DOCUMENTATION

1. The language, vocabulary, and organization of the material in the documentation are easily comprehended.

2. All information is correct (e.g., graphs, text, statistics).

3. Expected learning outcomes are listed. If particular skills are to be developed, they are specified.

4. An explanation of the ideas and principles from which the program was developed is given.

5. The particular skills to be learned through using the program are stated.

6. The teacher is given specific suggestions on where and how to combine the program with the existing curriculum.

7. Suggested follow-up activities geared to the students are given to reinforce the information presented.

8. Recommendations on where and how to use all student materials are given.

9. All necessary information is provided so that teachers or students can run the program from start to finish regardless of prior experience.

VII. WORK BEHAVIORS

1. Students are made aware of their competencies in relation to their intended occupations. Individual strengths and weaknesses can be determined and used as guidelines for further development.

2. Program presents all work as tasks to be approached and carried out in a conscientious manner. Regardless of the nature of the work, students are always encouraged to "give it their best effort."

3. Program encourages the achievement of maximum outcomes through the use of available resources.

4. Positive behaviors are advocated for getting, performing, and keeping a job. These behaviors include dependability, punctuality, cooperation, and initiative.

5. Program encourages students to solve problems and make decisions that have transferability to their occupations and everyday lives.

6. Emphasis is placed on "people skills"--the ability to communicate and get along with people.

7. Students complete the program feeling that they have accomplished something. Equally important, the means of accomplishment leaves students feeling good about themselves and their ability to complete the task.

8. Individual creativity is promoted through the opportunity to develop new ideas, products, or ways of performing tasks.

VIII. APPLICATION PROGRAMS

1. Program offers sufficient versatility and detail that the coverage and complexity of the program can be changed to meet the specific needs of the students using it.

2. Specific commands or instructions to enter and manipulate data are logical in nature and simple to use.

3. Process required to change data (frequently numbers) is simple to understand and easy to use.

4. Information being used in the program can be corrected or changed at any time without having to rerun the entire program.

5. All fields and variables necessary to perform the task are available, or the program is adaptable so the necessary variables and fields can be added.

6. Program provides the same answer or outcome each time, so that one can depend on its accuracy.

7. Program performs the task it is supposed to do.

8. Supplementary information or data source is provided to use in learning to run the program.

9. Program provides for printer use when hard copy of the resulting information is advantageous.

10. The sequence in moving from one operation to another is easy to understand and implement.

11. Program is either <u>bundled</u> (designed to be compatible with other application programs) or <u>integrated</u> (developed specifically to be combined with other particular application programs).

12. Tutorial program presents the concepts and information needed in learning to operate the application program.

<u>Part C</u>

An explanation of each item in Part C of the evaluation form is provided as follows.

1. SUMMARY COMMENTS — Describe the advantages of this particular courseware. If possible, compare it with other courseware reviewed.

	Describe the disadvantages of this particular courseware. If possible, compare it with other courseware reviewed. Explain different ways the courseware might be used in learning situations, both in the classroom and in informal settings.
2. SUMMARY OF SECTION EVALUATIONS	Summarize the rating of the courseware by section of Part B of the evaluation form.
3. FINAL RECOMMENDATION	Give a final overall rating of the courseware for instructional use and a brief explanation of why that rating was given.

CHAPTER IV

RECOMMENDATIONS

The major recommendation emerging from this study is that a centralized agency or network of agencies provide national leadership in microcomputer courseware availability and evaluation for vocational and technical education. The National Center, or the National Center in cooperation with the National Network for Curriculum Coordination in Vocational and Technical Education (NNCCVTE), could provide the leadership needed. The Vocational Education Curriculum Materials (VECM) database, developed and maintained by the National Center and NNCCVTE, could serve as the vehicle to disseminate information on the avilability and evaluation of microcomputer courseware.

Based on the activities of this study and the many requests (over 50 in the last 3 months) received from the field, the 2 major areas of concern related to microcomputer courseware to be addressed are evaluation and availability.

The following activities are suggested to provide national leadership in implementing A System for Evaluating Microcomputer Courseware for Vocational and Technical Education and in providing information on the availability of microcomputer courseware:

- o Disseminate information about the courseware evaluation system. A dissemination plan should be developed and implemented that will make the courseware evaluation system widely available. Information about the system can be made available through existing National Center mechanisms such as electronic newsletters, printed publications, conferences, and workshops. Existing vocational and technical networks and agencies such as NNCCVTE and the National Postsecondary Alliance could

disseminate information about the system. The courseware evaluation system can be made avilable through NNCVTE, ERIC, and the product cost-recovery system at the National Center.

- o Solicit endorsement of the courseware evaluation system from vocational and technical education professional organizations (e.g., American Vocational Association, American Home Economics Association, and American Association of Teacher Educators in Agriculture). Endorsement by these organizations would promote the use of the system throughout the field on a national basis. This in turn should lead to the development of better-quality courseware for use in vocational and technical education.

- o Collaborate with publishing companies and other agencies to facilitate the adoption and use of the courseware evaluation system. Interest has been expressed by McGraw-Hill, the National Education Association (NEA), and the Northwest Regional Education Laboratory (NWREL) to engage in collaborative efforts in courseware evaluation with the National Center.

- o Conduct technical assistance programs on the courseware evaluation system. Although the evaluation system can be used by individuals without specific training, it would be more beneficial, if technical assistance, including hands-on experience, were provided. Expecially developed training materials would complement the technical assistance programs.

- o Provide leadership in the conduct and dissemination of vocational and technical education courseware reviews. Leadership should be given to implementing professional courseware reviews using the new evaluation system. It is suggested that at least three vocational and technical educators trained by the National Center evaluate a given courseware product using the evaluation form. Their evaluations would be synthesized before a review is published.

- o Disseminate professional courseware reviews through established mechanisms such as National Center publications and electronic newsletters. Information about courseware reviews could be made available through VECM. Professional courseware reviews are a valuable screening device that practitioners can use in selecting courseware they wish to evaluate further.

- o Field-test the courseware evaluation system. Extensive field testing of the courseware evaluation system should be conducted to further refine the system and to implement a first update when needed.

- o Review the courseware evaluation system annually to determine if there is a need for updating. Revise when necessary. Field-test whenever revisions are extensive.

- o Explore the possibility of expanding the VECM database to include information about commercially produced courseware as well as public domain courseware. Since one of the greatest concerns in the field currently is locating courseware, the National Center and NNCCVTE could serve

practitioners well by including commercial courseware products in VECM. This would provide not only a much needed service but also eliminate the current restriction on entering a public domain product that might become available commercially.

- Expand the scope of the evaluation system to include the means for collecting student ratings of courseware for teacher use. Students could be questioned on the pace of instruction, the amount of material covered, the "interest factor", and the difficulty of the courseware. This information could then be used to validate the teacher's evaluation of courseware.

APPENDIXES

A. Technical Panel I

Participants

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Confirmation Letter to Panelists

OSU

The Ohio State University

THE NATIONAL CENTER FOR RESEARCH IN VOCATIONAL EDUCATION

1960 Kenny Road
Columbus, Ohio 43210

Phone: 614-486-3655
Cable: CTVOCEDOSU/Columbus, Ohio

August 4, 1983

Dear

We are pleased that you have agreed to serve on the panel to assist us in developing a system for evaluating microcomputer instructional software for vocational and technical education.

The panel will convene at the National Center, September 21-22, 1983. Arrangements for lodging have been made for you at the Hilton Inn-University, 3110 Olentangy River Road for the nights of September 20 and 21. You will need to take a taxi from the airport to the Hilton Inn. You will be met in the Hilton Inn lobby on both September 21 and 22 at 8:00 a.m. to be transported to the National Center for the meeting to start at 8:30.

Enclosed are the following materials:

1. Agreement for Services (to be signed and returned immediately)
2. Travel Guidelines and Consultant Expense Report
3. Project Profile
4. Tentative Agenda

Please send us your flight schedule (arrival and returning times) and a vita in addition to the signed "Agreement for Services" form as soon as possible. Feel free to call, (800) 848-4815, if we can be of assistance. If I am out, please leave a message with Trudi Richardson, secretary.

We are looking forward to working with you.

Sincerely,

Shirley A. Chase, Ph.D.
Project Director

SAC:tgr

Enclosures

Agenda

Wednesday, August 24

8:00 Pick-Up at Hilton Inn
8:30 Welcome and Introductions
8:45 Project Orientation
Workshop Objectives and Procedures
9:30 Review and Rating of Evaluation Form

Break

10:15 Development of Evaluation Form

Lunch--AccuRay Cafeteria

1:00 Development of Evaluation Form

Break

3:15 Development of Evaluation Form
Selection of Response Format

Thursday, August 25

8:00 Pick-Up at Hilton Inn
8:30 Development of Evaluation Form

Break

10:00 Testing of Evaluation Form

Lunch--AccuRay Cafeteria

12:30 Final Recommendations on Evaluation Form
Suggestions for Guide
Closure

Courseware Reviewed and Evaluated
by Panel II Participants

Title	Source
Drivers' Education/Industrial Arts (Micrometer)	MECC
Shock	Lane Community College
Know Your Pattern	Orange Juice Software Systems
Reproduction	Micro Power and Light Company
The Daily Menu Analyzer	Orange Juice Software Systems
Automotive Technician Math	MECC

B. Technical Panel II

Participants

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Confirmation Letter to Panelists

OSU

The Ohio State University

THE NATIONAL CENTER FOR RESEARCH IN VOCATIONAL EDUCATION

1960 Kenny Road
Columbus, Ohio 43210

Phone: 614-486-3655
Cable: CTVOCEDOSU/Columbus, Ohio

August 10, 1983

Dear

We are pleased that you have agreed to serve on the panel to assist us in developing a system for evaluating microcomputer instructional software for vocational and technical education.

The panel will convene at the National Center, August 24-25, 1983. Arrangements for lodging have been made for you at the Hilton Inn-University, 3110 Olentangy River Road for the nights of August 23 and 24. You will need to take a taxi from the airport to the Hilton Inn. You will be met in the Hilton Inn lobby on both August 24 and 25 at 8:00 a.m. to be transported to the National Center for the meeting to start at 8:30.

Enclosed are the following materials:

1. Agreement for Services (to be signed and returned immediately)
2. Travel Guidelines and Consultant Expense Report
3. Project Profile
4. Tentative Agenda

Please send us your flight schedule (arrival and returning times) and a vita in addition to the signed "Agreement for Services" form as soon as possible. Feel free to call, (800) 848-4815, if we can be of assistance. If I am out, please leave a message with Trudi Richardson, secretary.

We are looking forward to working with you.

Sincerely,

Shirley A. Chase, Ph.D.
Project Director

SAC:tgr

Enclosures

Information Letter to Panelists

OSU

The Ohio State University

THE NATIONAL CENTER FOR RESEARCH IN VOCATIONAL EDUCATION

1960 Kenny Road
Columbus, Ohio 43210

Phone: 614-486-3655
Cable: CTVOCEDOSU/Columbus, Ohio

August 29, 1983

Dear

The project to develop a system for evaluating microcomputer instructional software for vocational education is well under way and we are looking forward to working with you on September 21-22.

To bring you up to date on our activities, we are enclosing a bibliography of software evaluation literature and a list of the evaluation forms we have acquired and examined. The preliminary form developed by staff after reviewing these materials is now being revised to incorporate suggestions made by the first panel which met August 24-25.

We hope that you will help us finalize an evaluation form specific to the needs of vocational and technical educators. We envision that this form, accompanied by a guide for its use, will be used by vocational and technical teachers in selecting software, reviewers of software, and software developers.

The agenda for the two-day session will include:

1. Review and recommendations for the evaluation form.
2. Testing of the finalized form.
3. Development of a user guide.

A packet of material, including the revised evaluation form, will be waiting for you on your arrival at the Hilton.

We welcome your ideas and assistance on this project. If you have any evaluation forms not on the enclosed list, or references to other pertinent literature, let us know or bring them with you. Also, we are in need of additional vocational and technical education software to test the form.

Contact us (800) 848-4815 if you have any questions. When I am not in the office, leave a message with my secretary, Trudi Richardson.

If you have not signed and returned your "Agreement for Services" form, please do so along with a vita for our records.

Sincerely,

Shirley A. Chase, Ph.D.
Project Director

Agenda

Wednesday, September 21

8:00 Pick-Up at Hilton Inn
8:30 Welcome and Introductions
8:45 Project Orientation
Workshop Objectives and Procedures
9:00 Explanation of Form recommended by Panel I
Review of Courseware Using Evaluation Form
9:45 General Comments/Discussion on Evaluation Form

Break

10:15 Refinement of Evaluation Form

Lunch--AccuRay Dining Room

1:00 Further Development of Evaluation Form

Break

3:15 Further Development of Evaluation Form
Closure

Thursday, September 22

8:00 Pick-Up at Hilton Inn
8:30 Opening Remarks
Review of Courseware Using Panel II Evaluation Form

Break

10:15 Final Revision of Evaluation Form
Individual Recommendations for Implementation of Form
Development of Guide

Lunch--AccuRay Dining Room

1:00 Development of Guide

Break

3:00 Development of Guide
Summary--Written Recommendations for Evaluation System

Courseware Reviewed and Evaluated
by Panel II Participants

Title	Source
Caffeine	Lane Community College
Drivers' Education/Industrial Arts (Micrometer)	MECC
Know Your Pattern	Orange Juice Software Systems
Automotive Technician Math	MECC
Heatloss	MECC
Compete	CONDUIT
The Clinical Dietitian in the Nutritional Care Process	OSU College of Medicine
The Ruler--Quarters	Southeast Oakland Vocational-Technical Education Center
Engine	Southeast Oakland Vocational-Technical Education Center
CPS: Career Planning System with Microcomputers	The Conover Company

C. Pilot Test

Teacher Reviewers

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Courseware Reviewed and Evaluated
by Teacher Reviewers

Title	Source
Caffeine	Northwest Vocational Curriculum Coordination Center
Hort-Plant	Northeast Curriculum Coordination Center
Know Your Pattern	Orange Juice Software Systems
Manure Fertilizer Value	Instructional Materials Services Department of Agricultural and Extension Education The Pennsylvania State University
Microcomputer Keyboarding	South-Western Publishing Company
Drivers' Education/Industrial Arts (Micrometer)	MECC

Review Form for Evaluation Form and Guide

I. Evaluation Form

A. What were your general reactions to the form?

1. Content:

2. Format:

B. Explain any difficulties you had in using the form.

C. What suggestions do you have for improving the form?

D. How do you see this form being used in vocational education?

II. Guide

A. What were your general reactions to the content of the guide?

B. Explain any difficulties you had in using the guide.

C. What suggestions do you have for improving the guide?

III. What suggestions do you have for the procedure (steps) to follow in reviewing and selecting software using the evaluation form and guide?

D. Supplemental Review during Dissemination and Utilization Conference

Reviewers

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Agenda

November 16, 1983, 3:10 p.m.
1960 Kenny Road, Room B

I. Orientation

A. Welcome and introductions

B. Project background

C. Purpose of session

1. Provide participants experience in evaluating courseware

2. Obtain suggestions for improving evaluation system

II. Courseware review using evaluation form

III. Discussion session on suggestions for improving evaluation form and guide

Courseware Reviewed and Evaluated by
Dissemination & Utilization Conference Participants

Title	Source
Automotive Math	MECC
Caffeine	Northwest Vocational Curriculum Coordination Center
Compete	CONDUIT
Data Entry Activities for the Microcomputer	South-Western Publishing Company
Developmental Stages	Northwest Vocational Curriculum Coordination Center
Drivers' Education/Industrial Arts (Micrometer)	MECC
Grab-a-Byte	Ohio Dairy Council
Heatloss	MECC
Hort-Plant	Massachusetts Vocational Curriculum Resource Center
Know Your Pattern	Orange Juice Software Systems
Microcomputer Keyboarding	South-Western Publishing Company
Agriculture Application Programs	Instructional Materials Service Department of Agricultural and Extension Education The Pennsylvania State University
Parts of Speech	Instructional Materials Laboratory University of Missouri-Columbia
Enterprise Sandwich Shops: A Market Simulation	McGraw-Hill
The Micro-Editor	South-Western Publishing Company
The Sentence	Instructional Materials Laboratory University of Missouri-Columbia

E. Microcomputer Courseware Reviewed

The commercial and public domain courseware products reviewed during this study are listed in the following pages. The vocational or technical area, courseware titles and availability information are presented. Each courseware product was reviewed on an Apple IIe microcomputer unless otherwise specified.

Area	Title	Availability
Agriculture	Compete	CONDUIT P.O. Box 388 Iowa City, IA 52244 (319) 353-5789
	"D Feed" Dairy Rationing Balance Program	District One Technical Institute-Eau Claire 620 W. Clairemont Avenue Eau Claire, WI 54701 (715) 836-3900
	Building Construction and Related Review Electric Motor and Related Review Arc Welding and Related Review	Hobar Publications 1234 Tiller Lane St. Paul, MN 55112 (612) 633-3170
	Vo-Ag Budgets S.O.E.P./Miscellaneous	Instructional Materials Service Department of Agricultural and Extension Education The Pennsylvania State University 13 Armsby Building University Park, PA 16802 (814) 863-3824
	Hort-Plant	Massachusetts Vocational Curriculum Resource Center 758 Marrett Road Lexington, MA 02173-7398 (617) 863-1863
	Farm Accounting and Records Management	Specialized Data Systems Incorporated P.O. Box 8278 Madison, WI 53708 (608) 241-5050

Area	Title	Availability
Business and Office	Magic Words--Spell Checker Magic Words II	Art Sci 10432 Burbank Boulevard North Hollywood, CA 91601 (213) 985-2922
	Typing Tutor (TRS-80) Typing Tutor II (TRS-80) Budgeting Tutorial Budgeting Simulation	EMC Publishing 300 York Avenue St. Paul, MN 55101 (800) 328-1452
	Microcomputer Keyboarding Data Entry Activities for the Microcomputer The Micro-Editor	South-Western Publishing Company 5101 Madison Road Cincinnati, OH 45227 (513) 271-8811 or (800) 543-1985
Health	Caffeine Inflammation Communicable Disease Re-Entry Nurse Evaluation Developmental Stages Stress Self-Assessment Anxiety--Stress--and the General Adaptation Syndrome Acid-Base Imbalances Wound Healing Shock Stressor Coping With Stress Nursing Math--Conversions Introduction	Northwest Vocational Curriculum Coordination Center Building 17 Airdustrial Park Olympia, WA 98504 (206) 753-0879 T5VO
	Reproduction	Micro Power and Light Co. 12820 Hillcrest Road Suite 224 Dallas, TX 75230 (214) 239-6620
Home Economics	Jumping Jack Flash! Grease Food For Thought You Are What You Eat	Dietary Data Analysis (DDA) P.O. Box 26 Hamburg, NJ 07419

Area	Title	Availability
Home Economics	Microcomputer Applications in Vocational Education: Home Economics I Home Economics II	Illinois Vocational Curriculum Center Sangamon State University Springfield, IL 62708 (217) 786-6375
	One-Baking	Massachusetts Vocational Curriculum Resource Center 758 Marrett Road Lexington, MA 02173-7398 (617) 863-1863
	Poison Proof Your Home Income Meets Expenses You Can Bank On It Comparative Buying Analyzing An Ad	MCE, Inc. 157 South Kalamazoo Mall Kalamazoo, MI 49007 (616) 345-8681
	Nutrition Health Maintenance Food Facts	Minnesota Educational Computing Consortium (MECC) 2520 Broadway Drive St. Paul, MN 55113-5199 (612) 638-0683
	Grab-A-Byte	Ohio Dairy Council 2929 Kenny Road, Suite 190 Columbus, OH 43221 (614) 451-2864
	Place Setting, Meal Service, and Table Manners Know Your Pattern OSP and The Principles of Egg Cookery, Quickbread Preparation and Vegetable Cookery Food Poisoning, Sanitation Preservation Daily Menu Analyzer Design Elements and Principles Nutrition and The 4 Basic Food Groups To Salt...Or Not To Salt?--The Sodium Analyzer	Orange Juice Software Systems 222 South Washington Avenue New Richmond, WI 54017 (715) 246-3588

Area	Title	Availability
Industrial Arts	Industrial Arts--Basic Computer Programs	Iowa Department of Public Instruction Grimes State Office Building Des Moines, IA 50319 (515) 281-4711
Marketing and Distributive Education	Microcomputer Applications for the Data Processing Work Kit Enterprise Sandwich Shops: A Market Simulation	McGraw-Hill Book Company Book Distribution Center Princeton Road Hightstown, NJ 08520 (609) 426-5000
	Inventory	MIND, Inc. 50 Washington Street, Suite 1201 Norwalk, CT 06854 (203) 846-3435 or (800) 243-5836
Trade and Industrial	Microcomputer Applications in Vocational Education: Trades and Industry I Trades and Industry II	Illinois Vocational Curriculum Center Sangamon State University Springfield, IL 62708 (217) 786-6375
	Mechanics--Engine Tune Up	MIND, Inc. 50 Washington Street, Suite 1201 Norwalk, CT 06854 (203) 846-3435 or (800) 243-5836
	Heatloss Auto Math Drivers' Education/ Industrial Education (Micrometer)	Minnesota Educational Computing Consortium (MECC) 2520 Broadway Drive St. Paul, MN 55113-5199 (612) 638-0683
	Hair Styling--Facial Shapes	Oswego County Board of Cooperative Educational Services (BOCES) P.O. Box 488, Route #64 Mexico, NY 13114 (315) 963-7251

Area	Title	Availability
Vocational Education, General	Computer Assisted Vocational Math	Northeast Network for Curriculum Coordination Rutgers University 200 Old Matawan Road Old Bridge, NJ 08857 (201) 390-1191
	Parts of Speech The Sentence	Instructional Materials Laboratory University of Missouri-Columbia 10 Industrial Education Building Columbia, MO 65211 (314) 882-2883
	Apple Pilot Demo Disk Freshmen Explore	Massachusetts Vocational Curriculum Resource Center 758 Marrett Road Lexington, MA 02173-7398 (617) 863-1863
Vocational Guidance	CPS: Career Planning System with Microcomputers	The Conover Company P.O. Box 155 Omno, WI 54963 (414) 685-5707
	CHOICES	CSG Corporation 277 S. Washington Street Suite 209 Alexandria, VA 22314 (703) 684-5101

F. Evaluation Forms Reviewed

The following is a listing of the evaluation forms acquired and reviewed by project staff. Many of these forms are copyrighted and permission to reproduce them is required from the developer. Persons wishing to examine any of the forms may contact the developer at the address given or consult the published source. Published sources cited here can be located in the References in this report.

Title	Developer/Source
Vocational Education	
Evaluation Form	Indiana University of Pensylvania College of Home Economics Published source: Kovis and Bloom (1983)
Vocational Education Software Evaluation	Oregon State Department of Education 700 Pringle Parkway SE Salem, OR 97310
Untitled Form	Oswego County BOCES Microcomputer Support Service County Route 64 Mexico, NY 13114
Software Evaluation Form	Published source: The Use of Microcomputers in Vocational Agriculture (Mincemoyer 1983)
Microcomputer Instructional Software Evaluation	Published source: Microcomputers: Vocational Training for Small Business Management (Heath and Camp 1983)
Microcomputer Business Software Evaluation	Published source: Microcomputers: Vocational Training for Small Business Management (Heath and Camp 1983)
General Education	
Courseware Evaluation and Description	MicroSIFT Published source: Jones and Vaughan (1983)
Microcomputer Courseware Evaluation Form	EPIE/CU Published source: Jones and Vaughan (1983)

School Microware Evaluation Form	Dresden Associates Published source: Jones and Vaughan (1983)
Courseware Report Card	Educational Insights, Inc. Published source: Jones and Vaughan (1983)
Microcomputer Educational Materials Evaluation	MECC Published source: Jones and Vaughan (1983)
Checklist for Microcomputer Program Revision	SOFTSWAP Published source: Jones and Vaughan (1983)
Evaluation Form for Microcomputer-Based Instructional Materials	CONDUIT Published source: Jones and Vaughan (1983)
Software Evaluation Checklist	National Council of Teachers of Mathematics Published source: Jones and Vaughan (1983)
Scholastic Software Evaluation	Scholastic Book Services Published source: Jones and Vaughan (1983)
Software Evaluation Form	Electronic Learning Published source: Jones and Vaughan (1983)
Computer Software Evaluation Form	Alexandria City Public Schools Published source: Dearborn (1982)
Software Evaluation Form and Checklist	The Computing Teacher Published source: Hilgenfeld (1982)
Evaluation of Courseware	Nancy Lee Olsen 800 Bryant Ave. Worthington, Ohio 43085
Courseware Evaluation Form	Microcomputer Resources Center Teachers College Columbia University Broadway & 116th St. New York, NY 10023

Microcomputer Instructional Software Evaluation	Instructional Software Selection Published source: Douglas & Neights (n.d.)
Initial Evaluation Form Teacher Evaluation Form	Waukesha County Technical Institute Waukesha, WI
Microcomputer Software Evaluation: Educational Courseware Microcomputer Software Evaluation: Application Software	B. June Schmidt, Assistant Professor Division of Vocational and Technical Education Virginia Polytechnic Institute and State University 213 Lane Hall Blacksburg, VA 24061
Courseware Evaluation (Revised)	MicroSIFT Northwest Regional Educational Laboratory 300 S. W. Sixth Avenue Portland, OR 97204
Computer Program Review	The Computing Teacher Published source: Watt (1982)
Evaluation of CAI Courseware	Random House, Inc. 400 Hahn Road Westminster, MD 21157
Courseware Evaluation Worksheet	College of Education University of Illinois at Champaign-Urbana Published source: Dennis (1979)
Software Evaluation, Educational and Technical	Tedd Brumbaugh Director of Research, Resource and Development Mesa County Valley School District 51 2115 Grand Avenue Grand Junction, CO 81501
CR Courseware Evaluation Form	Published source: "Curriculum Review's Guidelines" (May 1982)
Review Rating Form	CONDUIT Published source: Peters and Hepler (1982)
Guide to the Software Assessment Procedure. Reviewer Document #1: Courseware	NEA Educational Computer Service Published source: National Education Association (1983a)

Guide to the Software Assessment Procedure. Reviewer Document #2: Applications Software	NEA Educational Computer Service Published source: National Education Association (1983b)
Guide to the Software Assessment Procedure. Reviewer Document #3: Combination Products	NEA Educational Computer Service Published source: National Education Association (1983c)
EPIE and Consumers Union Micro-Courseware PRO/FILE & Evaluation	EPIE/CU P.O. Box 839 Water Mill, NY 11976
Evaluation of Educational Course Ware	Arizona Center for Vocational Education P.O. Box 6025 Flagstaff, AZ 86011
Signer Student Software Questionnaire; and Signer Teacher Software Evaluation Checklist	The Computing Teacher Published source: Signer (1983)
CAI Materials Appraisal Process	The Ohio State University College of Medicine Division of Computing Services for Medical Education and Research 076 Health Sciences Library Columbus, OH 43210
Simulation-CAI Materials Appraisal Process	The Ohio State University College of Medicine Division of Computing Services for Medical Education and Research 076 Health Sciences Library Columbus, OH 43210
Evaluation Form	EMC Publishing Co. 300 York Avenue St. Paul, MN 55101
Software Evaluation Checklist	Francis Tuttle Vo-Tech Center 12777 North Rockwell Oklahoma City, OK 73142
Checklist for Identifying Learning Program Characteristics	Educational Technology Published source: Wade (1980)
Modified MCE Program Evaluation Form	Microcomputers in Special Education Published source: Taber (1983)

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